

# MATERIAL SAFETY DATA SHEET PACKET

**National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2300**

**Gaithersburg, Maryland 20899-2300**

**SRM Number: 1847**

**SRM Name: Ethanol-Water Solutions**

(Breath-Alcohol Testing: Three Levels)

**Date of Issue: 19 June 2006**

**MSDS Coordinator: Mario Cellarosi**

**Telephone: 301-975-6776**

**FAX: 301-926-4751**

**E-mail: SRMMSDS@nist.gov**

**Emergency Telephone Chem Trec:**

**1-800-424-9300 (North America)**

**+1-703-527-3887 (International)**

**Description:** Standard Reference Material (SRM) 1847 is a set of three levels of ethanol (ethyl alcohol: Chemical Abstracts Service [CAS] Registry Number 64-17-5) in water. A unit of SRM 1847 consists of six 10-milliliter ampoules (two ampoules each of the nominal concentrations of 2 %, 6 %, and 25 % by mass), each containing approximately 10 mL of solution.

**SRM 2897 Ethanol-Water Solution (nominal 2 % by mass)**

**SRM 2898 Ethanol-Water Solution (nominal 6% by mass)**

**SRM 2899 Ethanol-Water Solution (nominal 25 % by mass)**

MSDSs are provided for SRM 2897, SRM 2898, and SRM 2899 with hazardous components 1 % or greater and carcinogens 0.1 % or greater listed in compliance with OSHA 29 CFR 1910.1200.

# MATERIAL SAFETY DATA SHEET

## 1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2300  
Gaithersburg, Maryland 20899-2300

SRM Number: 2897  
MSDS Number: 2897  
SRM Name: Ethanol-Water Solution  
(nominal 2 % by mass)

Date of Issue: 19 June 2006

MSDS Coordinator: Mario Cellarosi  
Telephone: 301-975-6776  
FAX: 301-926-4751  
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:  
1-800-424-9300 (North America)  
+1-703-527-3887 (International)

**Description:** Standard Reference Material (SRM) 2897 is a solution of ethanol in water at a nominal concentration of 2 % by mass. There are two ampoules of SRM 2897 included in a unit of SRM 1847.

**Substance:** Ethanol-Water Solution (nominal 2 % by mass)

## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS<sup>1</sup>

<b>Component:</b>	<b>Ethanol</b>
<b>Other Designations:</b>	<b>Ethanol</b> (ethyl alcohol; ethyl hydroxide; ethyl hydrate; methyl carbinol; absolute alcohol; fermentation alcohol)
<b>CAS Number:</b>	64-17-5
<b>EC Number (EINECS):</b>	200-578-6
<b>SRM Nominal Concentration (mass %):</b>	2
<b>EC Classification:</b>	F
<b>EC Risk (R No.):</b>	11
<b>EC Safety (S No.):</b>	2, 7, 16

<sup>1</sup>Hazardous components 1 % or greater; Carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

## 3. HAZARDS IDENTIFICATION

**NFPA Ratings (Scale 0-4):** Health = 2      Fire = 2      Reactivity = 0

**Major Health Hazards:** Respiratory tract irritation. Skin irritation. Eye irritation. Central nervous system depression. Liver damage.

### Potential Health Effects

**Inhalation:** Exposure to 1 000 ppm to 10 000 ppm may cause temporary irritation of the upper respiratory tract, coughing, and central nervous system depression. Symptoms may include headache, fatigue, dizziness, drowsiness, dullness, lassitude, and loss of appetite. Repeated or prolonged exposure by inhalation may cause irritation of the mucous membranes, headache, dizziness, nervousness, fatigue, nausea, lack of concentration, and sleepiness.

**Skin Contact:** Acute exposure of ethanol to the skin may cause mild redness and burning. May occasionally cause allergic contact dermatitis. Repeated or prolonged contact with ethanol, the liquid, can cause dermatitis.

**Eye Contact:** Vapor concentrations of ethanol of 1 000 ppm to 10 000 ppm may cause temporary eye irritation. Direct contact of the liquid may cause immediate burning and stinging. Repeated or prolonged contact may cause conjunctivitis.

**Ingestion:** Ingestion of ethanol may cause emotional lability and decreased inhibitions with symptoms of drunkenness. Death may occur from respiratory or circulatory failure or later from aspiration pneumonitis or pulmonary edema. Repeated or prolonged exposure may cause damage to the liver, kidneys, and brain. The heart may also be affected.

**Listed as a Carcinogen/  
Potential Carcinogen:**

**Ethanol**

Yes	No
_____	X
_____	X
_____	X

In the National Toxicology Program (NTP) Report on Carcinogens.

In the International Agency for Research on Cancer (IARC) Monographs.

By the Occupational Safety and Health Administration (OSHA).

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#### 4. FIRST AID MEASURES

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**Inhalation:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration, if not breathing, by qualified personnel. Get immediate medical attention.

**Skin Contact:** Rinse affected area with copious amounts of water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.

**Eye Contact:** Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

**Ingestion:** Get immediate medical attention. If vomiting occurs, keep head lower than hips to prevent aspiration. Give artificial respiration, if not breathing, by qualified personnel.

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#### 5. FIRE FIGHTING MEASURES

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**Fire and Explosion Hazards:** Ethanol is a severe fire hazard. The vapor is heavier than air and may ignite by a distant ignition source and flash back. Vapor/air mixtures are explosive above the flash point.

**Extinguishing Media:** Alcohol resistant foam. Carbon dioxide. Regular dry chemical. Water.

**Fire Fighting:** Move container from fire area if it can be done without risk. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**Component:** **Ethanol (nominal 2 % by mass)**

**Flash Point:** Not available.

**Method Used:** Not available.

**Autoignition Temp.:** 363 °C (ethanol)

**Flammability Limits in Air**

**UPPER (Volume %):** 19 (ethanol)

**LOWER (Volume %):** 3.3 (ethanol)

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#### 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:** Avoid heat, flames, sparks, and other sources of ignition. Remove sources of ignition. Reduce vapors with water spray. Absorb small, spilled material volumes with sand or other non-combustible material. Collect spilled material in an appropriate container for disposal.

**Disposal:** Refer to Section 13, "Disposal Considerations".

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#### 7. HANDLING AND STORAGE

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**Storage:** Store and handle in accordance with all current regulations and standards.

**Safe Handling Precautions:** See Section 8, "Exposure Controls and Personal Protection".

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#### 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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**Exposure Limits:** **Ethanol**

OSHA (PEL): 1 900 mg/m<sup>3</sup> (1 000 ppm) TWA

ACGIH: 1 900 mg/m<sup>3</sup> (1 000 ppm) TWA

NIOSH: 1 900 mg/m<sup>3</sup> (1 000 ppm) recommended TWA (10 h)

WEL UK: 1 920 mg/m<sup>3</sup> (1 000 ppm) TWA

<b>Ventilation:</b>	Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present.
<b>Respirator:</b>	If necessary, refer to the “NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84” for selection and use of respirators certified by NIOSH.
<b>Eye Protection:</b>	Wear safety goggles. An eye wash station should be readily available near areas of use.
<b>Personal Protection:</b>	Wear appropriate protective clothing and chemically resistant gloves to prevent skin exposure.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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<b>Component:</b>	<b>Ethanol (nominal 2 % by mass)</b>
<b>Appearance and Odor:</b>	Liquid. Colorless. Fruity odor.
<b>Boiling Point:</b>	98 °C (208 °F)
<b>Water Solubility:</b>	Soluble.
<b>Solvent Solubility:</b>	Soluble in benzene, ether, and acetone.

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## 10. STABILITY AND REACTIVITY

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<b>Stability:</b>	<u>  X  </u> Stable <u>      </u> Unstable
	Stable at normal temperatures and pressure.
<b>Conditions to Avoid:</b>	Avoid heat, flames, sparks, and other sources of ignition. Avoid contact with incompatible material.
<b>Incompatible Materials:</b>	Halo carbons. Metals. Metal salts. Oxidizing materials. Halogens. Peroxides. Acids. Metal oxides. Bases. Combustible materials.
<b>Fire/Explosion Information:</b>	See Section 5, “Fire Fighting Measures”.
<b>Hazardous Decomposition:</b>	Thermal decomposition will produce oxides of carbon.
<b>Hazardous Polymerization:</b>	<u>      </u> Will Occur <u>  X  </u> Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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<b>Route of Entry:</b>	<u>  X  </u> Inhalation <u>  X  </u> Skin <u>  X  </u> Ingestion
<b>Toxicity Data:</b>	<b>Ethanol</b> Man, Intermittent Oral TD <sub>LO</sub> : 22 500 mg/kg (4 weeks) Man, Oral TD <sub>LO</sub> : 3 371 µL/kg Man, Oral TD <sub>LO</sub> : 1 430 µg/kg Man, Oral TD <sub>LO</sub> : 50 mg/kg
<b>Tumorigenic, Reproductive, Mutagenic Data:</b>	Ethanol has been investigated as a tumorigenic, mutagenic, and reproductive effector.
<b>Health Effects (Acute and Chronic):</b>	See Section 3: “Hazards Identification” for potential health effects.

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## 12. ECOLOGICAL INFORMATION

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<b>Ecotoxicity Data:</b>	Highly toxic to aquatic life.
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal:</b>	Dispose in accordance with all applicable federal, state, and local regulations.
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## 14. TRANSPORTATION INFORMATION

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### SRM 1847

#### U.S. DOT and IATA:

Ethanol Solution, UN Number 1170, Hazard Class 3, Packing Group III, Excepted Quantity.

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## 15. REGULATORY INFORMATION

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#### U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: Yes.

CHRONIC: Yes.

FIRE: Yes.

REACTIVE: No.

SUDDEN RELEASE: No.

#### State Regulations:

California Proposition 65: Not regulated.

#### CANADIAN Regulations

#### WHMIS Classification:

Not determined.

#### EUROPEAN Regulations

#### EC Classification (assigned):

F Highly flammable.

#### EC Risk Phrases:

R11 Highly flammable.

#### EC Safety Phrases:

S2 Keep out of reach of children.

S7 Keep container tightly closed.

S16 Keep away from sources of ignition. No smoking.

#### National Inventory Status

#### U.S. Inventory (TSCA):

Ethanol: Listed on inventory.

#### TSCA 12(b)

#### Export Notification:

Ethanol: Not listed.

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## 16. OTHER INFORMATION

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**Sources:** MDL Information Systems, Inc., MSDS *Ethyl Alcohol, 5 %*, 08 December 2005.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.

# MATERIAL SAFETY DATA SHEET

## 1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2300  
Gaithersburg, Maryland 20899-2300

SRM Number: 2898  
MSDS Number: 2898  
SRM Name: Ethanol-Water Solution  
(nominal 6 % by mass)

Date of Issue: 19 June 2006

MSDS Coordinator: Mario Cellarosi  
Telephone: 301-975-6776  
FAX: 301-926-4751  
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:  
1-800-424-9300 (North America)  
+1-703-527-3887 (International)

**Description:** Standard Reference Material (SRM) 2898 consists of a solution of ethanol in water at a nominal concentration of 6 % by mass. There are two ampoules of SRM 2898 included in a unit of SRM 1847.

**Substance:** Ethanol-Water Solution (nominal 6 % by mass)

## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS<sup>1</sup>

<b>Component:</b>	<b>Ethanol</b>
<b>Other Designations:</b>	<b>Ethanol</b> (ethyl alcohol; ethyl hydroxide; ethyl hydrate; methyl carbinol; absolute alcohol; fermentation alcohol)
<b>CAS Number:</b>	64-17-5
<b>EC Number (EINECS):</b>	200-578-6
<b>SRM Nominal Concentration (mass %):</b>	6
<b>EC Classification:</b>	F
<b>EC Risk (R No.):</b>	11
<b>EC Safety (S No.):</b>	2, 7, 16

<sup>1</sup>Hazardous components 1 % or greater; Carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

## 3. HAZARDS IDENTIFICATION

**NFPA Ratings (Scale 0-4):** Health = 2      Fire = 2      Reactivity = 0

**Major Health Hazards:** Respiratory tract irritation. Skin irritation. Eye irritation. Central nervous system depression. Liver damage.

### Potential Health Effects

**Inhalation:** Exposure to 1 000 ppm to 10 000 ppm may cause temporary irritation of the upper respiratory tract, coughing, and central nervous system depression. Symptoms may include headache, fatigue, dizziness, drowsiness, dullness, lassitude, and loss of appetite. Repeated or prolonged exposure by inhalation may cause irritation of the mucous membranes, headache, dizziness, nervousness, fatigue, nausea, lack of concentration, and sleepiness.

**Skin Contact:** Acute exposure of ethanol to the skin may cause mild redness and burning. May occasionally cause allergic contact dermatitis. Repeated or prolonged contact with ethanol, the liquid, can cause dermatitis.

**Eye Contact:** Vapor concentrations of ethanol of 1 000 ppm to 10 000 ppm may cause temporary eye irritation. Direct contact of the liquid may cause immediate burning and stinging. Repeated or prolonged contact may cause conjunctivitis.

**Ingestion:** Ingestion may cause emotional lability and decreased inhibitions with symptoms of drunkenness. Death may occur from respiratory or circulatory failure or later from aspiration pneumonitis or pulmonary edema. Repeated or prolonged exposure may cause damage to the liver, kidneys, and brain. The heart may also be affected.

**Listed as a Carcinogen/  
Potential Carcinogen:**

**Ethanol**

Yes      No

\_\_\_\_\_ X

\_\_\_\_\_ X

\_\_\_\_\_ X

In the National Toxicology Program (NTP) Report on Carcinogens.

In the International Agency for Research on Cancer (IARC) Monographs.

By the Occupational Safety and Health Administration (OSHA).

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#### 4. FIRST AID MEASURES

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**Inhalation:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration, if not breathing, by qualified personnel. Get immediate medical attention.

**Skin Contact:** Rinse affected area with copious amounts of water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.

**Eye Contact:** Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

**Ingestion:** Get immediate medical attention. If vomiting occurs, keep head lower than hips to prevent aspiration. Give artificial respiration, if not breathing, by qualified personnel.

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#### 5. FIRE FIGHTING MEASURES

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**Fire and Explosion Hazards:** Ethanol is a severe fire hazard. The vapor is heavier than air and may ignite by a distant ignition source and flash back. Vapor/air mixtures are explosive above the flash point.

**Extinguishing Media:** Alcohol resistant foam. Carbon dioxide. Regular dry chemical. Water.

**Fire Fighting:** Move container from fire area if it can be done without risk. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**Component:** Ethanol (nominal 6 % by mass)

**Flash Point:** 62 °C (144 °F)

**Method Used:** Closed Cup (CC).

**Autoignition Temp.:** 363 °C (ethanol)

**Flammability Limits in Air**

**UPPER (Volume %):** 19 (ethanol)

**LOWER (Volume %):** 3.3 (ethanol)

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#### 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:** Avoid heat, flames, sparks, and other sources of ignition. Remove sources of ignition. Reduce vapors with water spray. Absorb small, spilled material volumes with sand or other non-combustible material. Collect spilled material in an appropriate container for disposal.

**Disposal:** Refer to Section 13, "Disposal Considerations".

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#### 7. HANDLING AND STORAGE

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**Storage:** Store and handle in accordance with all current regulations and standards.

**Safe Handling Precautions:** See Section 8, "Exposure Controls and Personal Protection".

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#### 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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**Exposure Limits:** Ethanol

OSHA (PEL): 1 900 mg/m<sup>3</sup> (1 000 ppm) TWA

ACGIH: 1 900 mg/m<sup>3</sup> (1 000 ppm) TWA

NIOSH: 1 900 mg/m<sup>3</sup> (1 000 ppm) recommended TWA (10 h)

WEL UK: 1 920 mg/m<sup>3</sup> (1 000 ppm) TWA

<b>Ventilation:</b>	Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present.
<b>Respirator:</b>	If necessary, refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.
<b>Eye Protection:</b>	Wear safety goggles. An eye wash station should be readily available near areas of use.
<b>Personal Protection:</b>	Wear appropriate protective clothing and chemically resistant gloves to prevent skin exposure.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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<b>Component:</b>	<b>Ethanol (nominal 6 % by mass)</b>
<b>Appearance and Odor:</b>	Liquid. Colorless. Fruity odor.
<b>Boiling Point:</b>	95 °C (203 °F)
<b>Water Solubility:</b>	Soluble.
<b>Solvent Solubility:</b>	Soluble in benzene, ether, and acetone.

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## 10. STABILITY AND REACTIVITY

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<b>Stability:</b>	<u>  X  </u> Stable <u>      </u> Unstable
<b>Conditions to Avoid:</b>	Avoid heat, flames, sparks, and other sources of ignition. Avoid contact with incompatible material.
<b>Incompatible Materials:</b>	Halo carbons. Metals. Metal salts. Oxidizing materials. Halogens. Peroxides. Acids. Metal oxides. Bases. Combustible materials.
<b>Fire/Explosion Information:</b>	See Section 5, "Fire Fighting Measures".
<b>Hazardous Decomposition:</b>	Thermal decomposition will produce oxides of carbon.
<b>Hazardous Polymerization:</b>	<u>      </u> Will Occur <u>  X  </u> Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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<b>Route of Entry:</b>	<u>  X  </u> Inhalation <u>  X  </u> Skin <u>  X  </u> Ingestion
<b>Toxicity Data:</b>	<b>Ethanol</b> Man, Intermittent Oral TD <sub>LO</sub> : 22 500 mg/kg (4 weeks) Man, Oral TD <sub>LO</sub> : 3 371 µL/kg Man, Oral TD <sub>LO</sub> : 1 430 µg/kg Man, Oral TD <sub>LO</sub> : 50 mg/kg
<b>Tumorigenic, Reproductive, Mutagenic Data:</b>	Ethanol has been investigated as a tumorigenic, mutagenic, and reproductive effector.
<b>Health Effects (Acute and Chronic):</b>	See Section 3: "Hazards Identification" for potential health effects.

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## 12. ECOLOGICAL INFORMATION

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<b>Ecotoxicity Data:</b>	Highly toxic to aquatic life.
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal:</b>	Dispose in accordance with all applicable federal, state, and local regulations.
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## 14. TRANSPORTATION INFORMATION

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**SRM 1847**

**U.S. DOT and IATA:**

Ethanol Solution, UN Number 1170, Hazard Class 3, Packing Group III, Excepted Quantity.

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## 15. REGULATORY INFORMATION

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**U.S. Regulations:**

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: Yes.

CHRONIC: Yes.

FIRE: Yes.

REACTIVE: No.

SUDDEN RELEASE: No.

**State Regulations:**

California Proposition 65: Not regulated.

**CANADIAN Regulations**

**WHMIS Classification:**

Not determined.

**EUROPEAN Regulations**

**EC Classification (assigned):**

F Highly flammable.

**EC Risk Phrases:**

R11 Highly flammable.

**EC Safety Phrases:**

S2 Keep out of reach of children.

S7 Keep container tightly closed.

S16 Keep away from sources of ignition. No smoking.

**National Inventory Status**

**U.S. Inventory (TSCA):**

Ethanol: Listed on inventory.

**TSCA 12(b)**

**Export Notification:**

Ethanol: Not listed.

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## 16. OTHER INFORMATION

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**Sources:** MDL Information Systems, Inc., MSDS *Ethyl Alcohol, 5 %*, 08 December 2005.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.

# MATERIAL SAFETY DATA SHEET

## 1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2300  
Gaithersburg, Maryland 20899-2300

SRM Number: 2899  
MSDS Number: 2899  
SRM Name: Ethanol-Water Solution  
(nominal 25 % by mass)

Date of Issue: 19 June 2006

MSDS Coordinator: Mario Cellarosi  
Telephone: 301-975-6776  
FAX: 301-926-4751  
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:  
1-800-424-9300 (North America)  
+1-703-527-3887 (International)

**Description:** Standard Reference Material (SRM) 2899 is a solution of ethanol in water at a nominal concentration of 25 % by mass. There are two ampoules of SRM 2899 included in a unit of SRM 1847.

**Substance:** Ethanol-Water Solution (nominal 25 % by mass)

## 2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS<sup>1</sup>

<b>Component:</b>	<b>Ethanol</b>
<b>Other Designations:</b>	<b>Ethanol</b> (ethyl alcohol; ethyl hydroxide; ethyl hydrate; methyl carbinol; absolute alcohol; fermentation alcohol)
<b>CAS Number:</b>	64-17-5
<b>EC Number (EINECS):</b>	200-578-6
<b>SRM Nominal</b>	
<b>Concentration (mass %):</b>	25
<b>EC Classification:</b>	F
<b>EC Risk (R No.):</b>	11
<b>EC Safety (S No.):</b>	2, 7, 16

<sup>1</sup>Hazardous components 1 % or greater; Carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200.

## 3. HAZARDS IDENTIFICATION

**NFPA Ratings (Scale 0–4):** Health = 2      Fire = 3      Reactivity = 0

**Major Health Hazards:** Respiratory tract irritation. Skin irritation. Eye irritation. Central nervous system depression. Liver damage.

### Potential Health Effects

**Inhalation:** Exposure to ethanol of 1 000 ppm to 10 000 ppm may cause temporary irritation of the upper respiratory tract, coughing, and central nervous system depression. Symptoms may include headache, fatigue, dizziness, drowsiness, dullness, lassitude, and loss of appetite. Repeated or prolonged exposure by inhalation may cause irritation of the mucous membranes, headache, dizziness, nervousness, fatigue, nausea, lack of concentration, and sleepiness.

**Skin Contact:** Acute exposure of ethanol to the skin may cause mild redness and burning. May occasionally cause allergic contact dermatitis. Repeated or prolonged contact with ethanol, the liquid, can cause dermatitis.

**Eye Contact:** Vapor concentrations of ethanol of 1 000 ppm to 10 000 ppm may cause temporary eye irritation. Direct contact of the liquid may cause immediate burning and stinging. Repeated or prolonged contact may cause conjunctivitis.

**Ingestion:** Ingestion of ethanol may cause emotional lability and decreased inhibitions with symptoms of drunkenness. Death may occur from respiratory or circulatory failure or later from aspiration pneumonitis or pulmonary edema. Repeated or prolonged exposure may cause damage to the liver, kidneys, and brain. The heart may also be affected.

**Listed as a Carcinogen/  
Potential Carcinogen:**

**Ethanol**

Yes      No

\_\_\_\_\_ X

In the National Toxicology Program (NTP) Report on Carcinogens.

\_\_\_\_\_ X

In the International Agency for Research on Cancer (IARC) Monographs.

\_\_\_\_\_ X

By the Occupational Safety and Health Administration (OSHA).

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#### 4. FIRST AID MEASURES

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**Inhalation:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration, if not breathing, by qualified personnel. Get immediate medical attention.

**Skin Contact:** Rinse affected area with copious amounts of water for at least 15 minutes while removing contaminated clothing. Get medical attention, if needed.

**Eye Contact:** Flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Get immediate medical attention.

**Ingestion:** Get immediate medical attention. If vomiting occurs, keep head lower than hips to prevent aspiration. Give artificial respiration, if not breathing, by qualified personnel.

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#### 5. FIRE FIGHTING MEASURES

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**Fire and Explosion Hazards:** Ethanol is a severe fire hazard. The vapor is heavier than air and may ignite by a distant ignition source and flash back. Vapor/air mixtures are explosive above the flash point.

**Extinguishing Media:** Alcohol resistant foam. Carbon dioxide. Regular dry chemical. Water.

**Fire Fighting:** Move container from fire area if it can be done without risk. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

**Component:** **Ethanol (nominal 25% by mass)**

**Flash Point:** 32 °C (90 °F)

**Method Used:** Closed Cup (CC).

**Autoignition Temp.:** 363 °C (ethanol)

**Flammability Limits in Air**

**UPPER (Volume %):** 19 (ethanol)

**LOWER (Volume %):** 3.3 (ethanol)

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#### 6. ACCIDENTAL RELEASE MEASURES

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**Occupational Release:** Avoid heat, flames, sparks, and other sources of ignition. Remove sources of ignition. Reduce vapors with water spray. Absorb small, spilled material volumes with sand or other non-combustible material. Collect spilled material in an appropriate container for disposal.

**Disposal:** Refer to Section 13, "Disposal Considerations".

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#### 7. HANDLING AND STORAGE

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**Storage:** Store and handle in accordance with all current regulations and standards.

**Safe Handling Precautions:** See Section 8, "Exposure Controls and Personal Protection".

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#### 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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**Exposure Limits:** **Ethanol**

OSHA (PEL): 1 900 mg/m<sup>3</sup> (1 000 ppm) TWA

ACGIH: 1 900 mg/m<sup>3</sup> (1 000 ppm) TWA

NIOSH: 1 900 mg/m<sup>3</sup> (1 000 ppm) recommended TWA (10 h)

WEL UK: 1 920 mg/m<sup>3</sup> (1 000 ppm) TWA

<b>Ventilation:</b>	Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present.
<b>Respirator:</b>	If necessary, refer to the “NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84” for selection and use of respirators certified by NIOSH.
<b>Eye Protection:</b>	Wear safety goggles. An eye wash station should be readily available near areas of use.
<b>Personal Protection:</b>	Wear appropriate protective clothing and chemically resistant gloves to prevent skin exposure.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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<b>Component:</b>	<b>Ethanol (nominal 25 % by mass)</b>
<b>Appearance and Odor:</b>	Liquid. Colorless. Fruity odor.
<b>Boiling Point:</b>	86 °C (186.8 °F)
<b>Water Solubility:</b>	Soluble.
<b>Solvent Solubility:</b>	Soluble in benzene, ether, and acetone.

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## 10. STABILITY AND REACTIVITY

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<b>Stability:</b>	<u>  X  </u> Stable <u>      </u> Unstable
	Stable at normal temperatures and pressure.
<b>Conditions to Avoid:</b>	Avoid heat, flames, sparks, and other sources of ignition. Avoid contact with incompatible material.
<b>Incompatible Materials:</b>	Halo carbons. Metals. Metal salts. Oxidizing materials. Halogens. Peroxides. Acids. Metal oxides. Bases. Combustible materials.
<b>Fire/Explosion Information:</b>	See Section 5, “Fire Fighting Measures”.
<b>Hazardous Decomposition:</b>	Thermal decomposition will produce oxides of carbon.
<b>Hazardous Polymerization:</b>	<u>      </u> Will Occur <u>  X  </u> Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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<b>Route of Entry:</b>	<u>  X  </u> Inhalation <u>  X  </u> Skin <u>  X  </u> Ingestion
<b>Toxicity Data:</b>	<b>Ethanol</b> Man, Intermittent Oral TD <sub>LO</sub> : 22 500 mg/kg (4 weeks) Man, Oral TD <sub>LO</sub> : 3 371 µL/kg Man, Oral TD <sub>LO</sub> : 1 430 µg/kg Man, Oral TD <sub>LO</sub> : 50 mg/kg
<b>Tumorigenic, Reproductive, Mutagenic Data:</b>	Ethanol has been investigated as a tumorigenic, mutagenic, and reproductive effector.
<b>Health Effects (Acute and Chronic):</b>	See Section 3: “Hazards Identification” for potential health effects.

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## 12. ECOLOGICAL INFORMATION

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<b>Ecotoxicity Data:</b>	Highly toxic to aquatic life.
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## 13. DISPOSAL CONSIDERATIONS

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<b>Waste Disposal:</b>	Dispose in accordance with all applicable federal, state, and local regulations.
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## 14. TRANSPORTATION INFORMATION

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**SRM 1847**  
**U.S. DOT and IATA:** Ethanol Solution, UN Number 1170, Hazard Class 3, Packing Group III, Excepted Quantity.

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## 15. REGULATORY INFORMATION

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**U.S. Regulations:** CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.  
SARA Title III Section 302 (40 CFR 355.30): Not regulated.  
SARA Title III Section 304 (40 CFR 355.40): Not regulated.  
SARA Title III Section 313 (40 CFR 372.65): Not regulated.  
OSHA Process Safety (29 CFR 1910.119): Not regulated.  
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):  
ACUTE: Yes.  
CHRONIC: Yes.  
FIRE: Yes.  
REACTIVE: No.  
SUDDEN RELEASE: No.

**State Regulations:** California Proposition 65: Not regulated.

**CANADIAN Regulations**  
**WHMIS Classification:** Not determined.

**EUROPEAN Regulations**  
**EC Classification (assigned):** Ethanol  
F Highly flammable.

**EC Risk Phrases:** R11 Highly flammable.

**EC Safety Phrases:** S2 Keep out of reach of children.  
S7 Keep container tightly closed.  
S16 Keep away from sources of ignition. No smoking.

**National Inventory Status**  
**U.S. Inventory (TSCA):** Ethanol: Listed on inventory.

**TSCA 12(b)**  
**Export Notification:** Ethanol: Not listed.

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## 16. OTHER INFORMATION

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**Sources:** MDL Information Systems, Inc., MSDS *Ethyl Alcohol, 20 %*, 08 December 2005.  
MDL Information Systems, Inc., MSDS *Ethyl Alcohol, 30 %*, 08 December 2005.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.